

ANALOG SAUSAGE AS A HEALTHY SNACK FOR TODDLERS: NUTRITIONAL VALUE CONTRIBUTION AND COST ANALYSIS

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Abstract

There are many different types of food products available in Indonesia, some of which have a new appearance, such as sausages. The development of snacks had to pay attention to biological values and prices, in order to be affordable and processed to the eating habits of the local community. The objectives of the study were to assess the contribution of nutritional value and cost analysis of analog sausages. This study used a quasi-experimental study by giving analog sausages to children under five for 4 weeks conducted from September to November 2021. Samples of 75 toddlers in Seluma district were taken by purposive sampling consisting of intervention group I, intervention group II and group each controlling as many as 25 toddlers. The inclusion criteria were children under five aged 12-59 months. The results showed the contribution of analog sausage nutritional value to the diet of each child under five in the control group averaged 213.5 kcal, intervention 1 was 253.5 kcal and intervention 2 was 232.0 kcal. The nutritional contribution of analog sausage protein for each child from each treatment was 7.16 grams, 9.35 grams, and 9.5 grams. Production costs were Rp. 69.300.00 and Rp. 109.2502.00 during the 3-week intervention. The production cost of analog sausage showed efficient and profitable in accordance with the criteria of MSME business efficiency in the analysis of analog sausage production, so it's recommended for consumption by toddlers.

Keywords: *Contribution of nutrients, cost analysis, analog sausage, toddler*

INTRODUCTION

Food products are abundant and varied in type in Indonesia, and some items are currently constantly appearing with new looks such as sausages, snacks, drinks, and others. People are enthusiastic when new products continue to appear in their consumption and prefer to consume fast food. The changing eating patterns of today's society due to the large number of modern foods circulating in the market make traditional food which is one of the cultural diversities of Indonesia decrease in consumption levels and is less well known. Analysis of the level of preference for functional sausages made from mackerel is preferred (Nurlaila, Sukainah, & Amiruddin, 2018).

Food processing which takes a long time and is relatively complicated is starting to be abandoned by the community due to their busy lives. Consumers today are more likely to consume practical and ready-to-eat food so sausages are one of the ready-to-eat food products that are much favored by the public. The development of functional fish sausage is one of the alternative food products that may be the choice of consumers. Functional fish sausage is a fish sausage that is added with additional ingredients containing nutritional elements and functional ingredients that are beneficial to the body. One of the additional ingredients that can be added to sausage processing is oyster mushrooms (Yuliatini & Kamsiah, 2019).

The acceptance of analog sausages at the beginning of the study turned out to be very liked by the children who were the research subjects. The results of observations in the field of children consuming analog sausages are like eating snacks while playing. The reason for the good acceptance of analog sausages is because the research location is one of the most fish-producing areas in the Bengkulu region. In addition, analog sausages are developed with seasoning formulations using natural spices modified from traditional regional specialties. As research in the manufacture of analog sausages with rice bran and oyster mushrooms. (Nurnaningsih, Fadilah, & Wijaya, 2021). The research of Yuliantini, Emy, & Kamsiah (2019) on making analog sausage formulations from sea cork fish with the addition of oyster mushrooms in elementary school children shows that it is widely liked. Analog sausage contains 11.8% protein, 7.2% fiber, 46.12% potassium and 70.58% water. Analysis of the nutritional value in 100 grams of analog sausage shows an energy content of 377 kcal, protein 17.5 grams, fat 19 grams and carbohydrates 24.45 grams, calcium 123.2 grams, and dietary fiber 1.58 grams. It means in 1 serving of 50 grams contains 188.5 kcal of energy, 8.75 grams of protein, 12.23 grams of fat, and 61.6 grams of carbohydrates.

The development of supplementary feeding in accordance with children's eating habits is important because it relates to children's preferences. Endang & Sunaryo (2004) state the development of supplementary feeding as a snack food in addition to paying attention to biological value and price so that it is affordable and processed properly. Pay attention to the eating habits of the local people.

The local government of Seluma Regency, especially those who are members of the Stunting Reduction Team and all levels of the community are committed to reducing stunting rates in 2020 so that Seluma Regency is Stunting-free and actively engages in a healthy lifestyle. Moore (1997) and Adi (2002) state that children aged 1-3 years and preschoolers have a reduced appetite because in general at this age children begin to have difficulty eating or only like snacks that are classified as empty of calories and nutrition. For toddlers, eating is sometimes an unpleasant thing because at this age what is exciting is playing. Dependence on parents began to decrease and refuse foods children like or not. At this stage, children really need the attention and direction of their parents (Sunardi, 2006). Ello & Martin (2002), states the portion of snacks had to be considered because the portion size of snacks affects energy intake. Sihadi's research (2004), showed traditional snacks contribute about 24.7% of the average total energy consumption per day and about 22.9% of the average total protein consumption per day in elementary school children. Manik's research (2001), stated that the contribution of traditional snacks for energy was 5.5% and protein 4.2% to the total daily food consumption of elementary school children. Ulya's research (2003), states that the contribution of snacks to daily consumption ranges from 10% -20%, namely energy from snacks contributes 17.36% and protein 12.4%, carbohydrates 15.1%, and fat 1% of daily consumption.

METHOD

Research Design and Subject

This study used a quasi-experimental study by giving analog sausages to children under five, which was carried out from September to November 2021. The giving of sausages to children under five was for 4 weeks. Sausage consumption was observed and recorded every day. There were three treatment groups consisting of 2 intervention groups and one control group. Intervention group I was given one serving/day of 50 g analog sausage (5 g protein) and intervention group II was given two servings/day of 100 g analog sausage (10 g protein), while the control group was given 50 g/day commercial fish sausage (5 0.05 g protein). The sample in this study was 75 toddlers in Seluma district, which were taken by purposive sampling consisting of intervention group I, intervention group II and a control group each of 25 toddlers. The inclusion criteria in this study were children under five aged 12-59 months, willing to be a sample that was approved by the parents of the toddler.

Instruments and Data Analysis Procedures

Data on the characteristics of the respondents were obtained by interview, and the food consumption of toddlers was obtained by recalling 2x24 hours. This research has been approved by the Health Research Ethics Commission of the Politeknik Kesehatan Kementerian Kesehatan Bengkulu with the Number: KEPK.M/146/09/2021. The results of the univariate analysis in this study were presented in tabular form to identify the contribution and cost analysis of analog sausages. Analysis of the data processed in this research was univariate and bivariate analysis with ANOVA test and production cost analysis.

FINDING

Characteristics of Toddlers

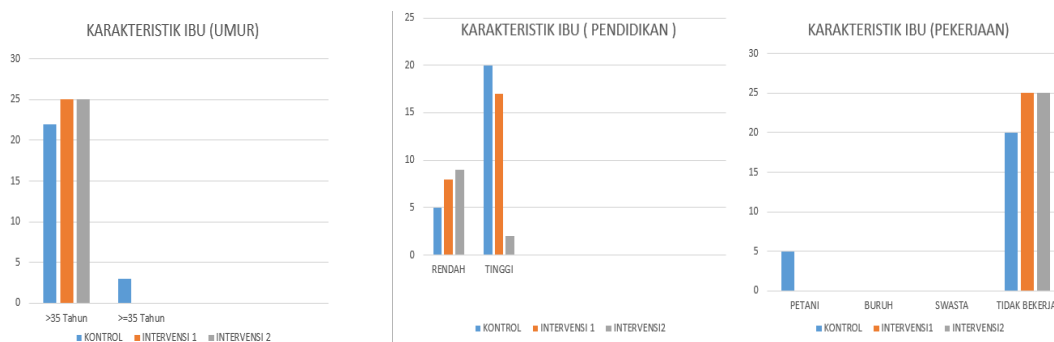
Table 1. Distribution of Toddlers by Age and Gender in Seluma District

Variable	Control		Intervention 1		Intervention 2		P value
	n	%	N	%	n	%	
Age							
1- 3	13	52	15	60	15	60	0,06
≥3	12	48	10	40	10	40	
Gender							
Boys	13	52	10	40	15	60	0,50
Girls	12	48	15	60	10	40	

Toddler age is grouped into age groups 1-3 years, and >3-5 years. The study showed that there was no difference in the age and gender of the children from the three groups with a p-value of 0.06 and a p-value of 0.50.

Characteristics of Mother of Toddlers

Graph 1. Characteristics of Mothers of Toddlers



Mothers as individuals play a role and are responsible for and accept their position in society. The graph above shows the mother's age, education, and occupation of the mother under five in the three treatment groups.

Analog Sausage Contribution

Table 2. Frequency Distribution of The Average Contribution of The Nutritional Value of Analog Sausage to Children Under Five in Seluma District

Contribution to the nutritional value of analog sausage	Group		
	Control (n=25)	Intervention I (n=25)	Intervention II (n=25)
Energy	213,5±7,31	253,5± 19,34	232,0± 12,31
Protein	7,16± 3,69	9,35± 7,8	9,5± 5,34

Table 2 showed the contribution of the nutritional value of analog sausages given to the treatment group, namely for energy in the control group the average is 213.5 kcal, the intervention group 1 is 253.5 kcal and in the intervention group, 2 is 232.0 kcal. Meanwhile, the contribution of analog sausage protein nutrients to each treatment was 7.16 grams, 9.35 grams, and 9.5 grams.

Cost Analysis

Giving analog sausages to toddlers

The analog social content was used in the intervention for three weeks by giving analog sausage 50 grams/day and 100 grams/day. The analog sausage was only given in Intervention 1 and Intervention II, while the comparison group was given commercial sausage. At the beginning of the study, the number of children who participated in the intervention was 26 children for each group, but in line with the research it turned out that not all children could participate until the end of the study. The reason for the children not being able to participate until the intervention was finished, in general, they felt bored every day having to eat analog sausage there were two children with the reason that one child had diarrhea in Group I, and one child was vomiting in Group II every time they ate analog sausage.

Production Cost

The components of production costs consist of the price of raw materials, labor, and overhead or profits. This is in line with what was stated by

Rainborn & Kinney (2011: 48), accrual-based accounting requires labor and overhead costs in connection with the conversion of raw materials or equipment that is accumulated and attached to product goods. The same thing was also found by Baldrice et al. (2011: 38) that, “production costs are classified into three, namely; a) The cost of raw materials (raw material costs); b) direct labor costs (direct labor costs); c) Factory overhead costs (manufacture overhead costs).

Table 3. Calculation of cost analysis of analog sausage intervention

Description	Unit		%		Volume	
	1	2	3	4	3	4
Raw Material Cost	1	22%	50/100	Rp. 15246	Rp. 15246	Rp 24.035
Labor Cost		13%	1/25000	Rp. 9,035	Rp. 9,035	Rp 14.202
Overhead Cost		65%	1	Rp. 41.580	Rp. 41.580	Rp 71.012
Total				Rp. 69300	Rp. 69300	RP109250

Based on the Table above, it can be seen that one intervention was given 50 grams. And intervention 2 dberi 100 grams of analog sausage. With a total production cost of Rp. 69,300 during the 3-week intervention and the total production for intervention 2 is 100gram with production costs. The cost analysis for intervention 1 is RP. 3,300 Cost for 1 time consumption for intervention 2 Rp 5,202. The components of production costs consist of the price of raw materials, labor, and overhead or profit. This is in line with what was stated by Rainborn and Kinney (2011: 48), accrual-based accounting requires labor and overhead costs in connection with the conversion of raw materials or equipment that is accumulated and attached to product goods. The same thing was also found by Baldrice et al. (2011: 38) that, “production costs are classified into three, namely; a) The cost of raw materials (raw material costs); b) direct labor costs (direct labor costs); c) Factory overhead costs (manufacture overhead costs).

DISCUSSION

Characteristics of Toddlers

The prevalence of stunting in Bengkulu decreased from 17% to 13%. The decline in the stunting rate only reached 4% between 2013 and 2018. The prevalence of malnutrition is still high but cases are still low. So that Bengkulu is included in the province that has public health problems. The policy to improve community nutrition that has been carried out in Bengkulu province

includes the problem of stunting. Stunting is a growth disorder due to malnutrition in children under five years old (Rahayu, Pamungkasari, & Wekadigunawan, 2018).

Optimal nutrition is essential for the normal growth and physical and intellectual development of infants, children, and all age groups. Good nutrition makes a normal or healthy body weight, the body is not susceptible to infectious diseases, increases work productivity, and is protected from chronic diseases and premature death. In order to keep the body healthy and avoid various chronic diseases or non-communicable diseases related to nutrition, the people's diet needs to be improved towards the consumption of balanced nutrition. Balanced nutrition is a daily diet that contains nutrients in the type and amount according to the body's needs, taking into account the principles of food diversity, physical activity, clean living behavior, and monitoring body weight regularly in order to maintain a normal weight to prevent nutritional problems. (Ministry of Health RI, 2014).

In an effort to meet the nutritional needs for a day, it is recommended that children be given the same food as adults, namely three times a day, main meals (morning, afternoon, and evening), and two snacks. Children eat regularly 3 times a day starting with breakfast or breakfast, lunch and dinner. In addition to the main meal 3 times a day, children of this age are also recommended to eat healthy snacks (Depkes RI, 2014). To prevent/reduce children from consuming unhealthy and non-nutritive foods, it is recommended that they always eat with their family. Breakfast every day is important especially for children because they are growing and experiencing brain development which is very dependent on regular food intake. Toddlers in one meal portion for Toddlers aged 12-59 months can be fulfilled from: - Rice / substitute: plate (100 grams) - Animal side dish: 1 medium slice (40 grams) - Vegetable side dish: 1 medium slice (50 gram) - Vegetables: 50 grams (1/2 cup) - Fruits: 50 grams (1 medium piece) For babies aged 6-11 months, the food given is adjusted to age, frequency, amount and texture (mashed / mushy (Kemenkes RI, 2018).

Characteristics of Mother Toddler

The characteristics of the mother indicate that there are several factors that characterize the respondents, ranging from age, education, and income. In the data above, we can note that there are about 75 people with each group of 25 people. Intervention and data collection were carried out every day for 3

weeks and 21 days. According to (Sugiarta et al., 2019) national education has the function to develop capabilities and shape the character and civilization of a dignified nation in order to educate the nation's life, and function to eliminate all sources of people's suffering from ignorance and backwardness. Age can affect a person's mindset and grasping power. As people get older, the mindset and grasping power of a person will be more developed accompanied by the experience that has been passed, so that the knowledge gained is getting better. Work is an activity that must be done every day. The work environment can make a person gain knowledge and experience either directly or indirectly. From the results of observations in the field, it was found that there are also parents of children who do not pay attention to the food needs of their children because they are more concerned with meeting other needs besides eating children, while from an economic point of view there is no problem to meet the needs of life every day.

The possible cause of this is that the level of education of parents is still very low, most of them only reach the level of basic education. Suharjo (1994) says that a person's ability to prepare dishes in the family is not inherited from parents but is acquired through the learning process. The same thing was stated by Kodyat (1994) that the level of a mother's education will determine the level of the mother's knowledge about nutrition. Mothers' level of knowledge about nutrition resulted in their low ability of mothers to spend on food (Winarno, 1990). Several studies conducted on infants and children revealed complementary feeding (PMT) with improvements in growth, decreased morbidity, and cognitive development, Sanjaya (2002) also said that various studies could provide a positive impact on children's weight gain even though it is small. The same thing was stated by Supadmi (2007) in a study on the impact of PMT on PEM toddlers with social development barriers, showing that there is an increase in body weight and an increase in nutritional status after PMT.

Analog Sausage Contribution

The acceptance of analog sausages at the beginning of the study turned out to be very liked by the children who were the research subjects. The results of observations in the field of children consuming analog sausages are like eating snacks while playing. The reason for the good acceptance of analog sausage is because the research location is one of the most fish-producing areas in the Seluma district. In addition, analog sausages were developed with a spice formulation using natural spices modified from traditional foods typical of the

Seluma district. The development of PMT in accordance with children's eating habits is important because it relates to children's preferences, as stated by Based on Endang and Sunaryo (2004) that the development of PMT in addition to paying attention to biological values must also pay attention to prices so that they are affordable and affordable. processed by taking into account the eating habits of the local community. As research in the manufacture of analog sausages with rice bran and oyster mushrooms. Differences in the concentration of bran and tapioca flour have an effect on the quality of analog sausages, namely the water content, protein, fat, fiber, carbohydrate, and ash content. The results of organoleptic tests include color, texture, aroma, and taste. The best treatment for analog sausages according to the MPE method from the recapitulation of organoleptic analysis is treatment D. This selected treatment produces analog sausages with color 16.55, aroma 6.4, taste 16.05, and texture 17.75 (Nurnaningsih, Fadilah, and Wijaya, 2021). Another advantage of sausage is the cheaper price of sausage-making materials (Sulistiyono and Hendarman, 2017).

Healthy food is food that contains nutrients that the body needs, safe food is food that does not contain elements that endanger health, and food that is not contaminated by either microorganisms or harmful chemicals (Liswarti Yusuf, et al, 2008). The quantity and quality of food and beverages consumed will affect nutritional intake it will affect the health of individuals and communities (Ministry of Health, 2014). The provision of snacks from local food has an influence on nutritional status because it increases the contribution of nutrient intake (Candra, Setiawan, Rizal, & Damanik, 2014). The development of snack food is very important because street food can be used as a daily snack and the average energy contribution from snack consumption is more than 20% (Hapsari, 2013). There is a need for handling the problem of malnutrition through the use of more varied raw materials, such as analog sausages. The contribution of nutrients from snacks to the Nutritional Adequacy Rate (RDA) is the average contribution of nutrients from all snacks given to the RDA. Energy, protein, vitamin A, and iron are nutrients whose contribution is calculated. The highest nutrient contribution from snack foods is vitamin A (14.49%). Contributions of other nutrients from snacks to the RDA of subjects include energy by 13.08%, protein by 10.28%, and iron by 6.56%. The results of Yasmin and Madanijah's research (2010) show that the average energy contribution of elementary school students' snack consumption is more than 20% (Candra, Setiawan, & Damanik, 2014)

The results of monitoring in the field after the children participated in the intervention for three weeks turned out that the children were still looking for analog sausages. This means that if the intervention is carried out on non-consecutive days or alternate days of giving analog sausages, it is likely that the child's length of time following the intervention could be more than 5 weeks. Furthermore, giving analog sausage was focused on intervention for three weeks on the grounds that the number of children who consumed analog sausage at three weeks between the two groups was almost the same and the number was statistically sufficient for analysis. Moore (1997) & Adi (2002) say that children aged 1-3 years and preschoolers have a reduced appetite because in general at this age children begin to have difficulty eating or only like snacks that are classified as empty of calories and nutrition. For toddlers, eating is sometimes an unpleasant thing because at this age what is exciting is playing. Dependence on their parents began to decrease and began to refuse foods that he did not like. At this stage, children really need the attention and direction of their parents (Sunardi, 2006). Birch et al (2001) explained that if the food provided by parents is low then the food intake received by the child is also low. Therefore, it can be concluded that low feeding contributes to the nutritional adequacy received by children (Erna & Erni, 2020).

Research conducted by Rachmawati Nila Hapsari which raised the title "Contribution of Snacks to Adequate Levels of Energy and Protein Intake in School Children who Receive PMT-AS at SD Negeri Plalan 1 Surakarta City" with the results of the study: a. Energy intake of 78.8% is in the normal category and the intake of snacks for children provides an average energy contribution of 13.2%, protein intake of 69.2% is in the normal category and provides an average protein contribution of 13.21%. The contribution of snacks to the level of energy and protein intake adequacy is 233.11 kcal, and 6.21 g protein. The students' snacks contributed 13.2% to the adequacy of energy intake, and 13.21% to protein intake. (Haris Nur Ashar & Janianton Damanik, 2021)

Cost Analysis

In Indonesia, stunting results from a complex interaction of factors, not only at the individual level but also at the household and community level (Wicaksono and Harsanti, 2020). the factors that cause stunting are low birth weight, male gender, infants with a history of the disease, and low economic levels (Supadmi & Balai, 2013) (Aryastami et al., 2017). Factors that cause

stunting are protein intake, birth weight, parental education, father's occupation, and family economic status. Some of the factors that cause nutritional problems is poverty. Poverty is considered to have an important role that is reciprocal as a source of nutritional problems, namely, poverty causes malnutrition, otherwise, individuals who are malnourished will slow down economic growth and encourage the poverty process. This is because if someone is malnourished, it will directly cause a loss of work productivity due to physical deficiency, and decreased cognitive function which will affect the level of education and the family's economic level.

Analog sausages have the advantage of having a higher fiber content of about 2.1% compared to commercial sausages. Commercial sausages have a 2.2% higher protein. Another advantage of analog sausages is the cheaper price of sausage-making materials (Sulistiyono & Hendarman, 2017). Analog sausage produced by involving MSMEs is Micro, Small, and Medium Enterprises that have attended coaching and training in making analog sausages. For the cost of production and selling price, the researcher assumes that the main raw materials used in the manufacture of analog sausages are the same. This is supported by the data that the researcher obtained at the time the research was conducted. In addition to the confidentiality of data that cannot be published by the owner, another obstacle is the absence of adequate accounting records to be able to classify costs in detail. In this case, the researcher uses data records provided by SMEs and also based on the results of observations and interviews. The results of the existing research illustrate that the cost of production and selling prices set in MSMEs with the processed data obtained is different. Where the current selling price is lower than the selling price based on the cost-plus pricing method. This is because the existing cost of production is higher than expected.

In determining the cost of production, MSME owners only use intuition and use improvised calculations without classifying the costs incurred, so that the cost assigned to the resulting product is calculated thoroughly. Another cause is also due to the lack of adequate financial records so that the owner has difficulty in calculating the costs incurred, including calculating costs based on their classification. Likewise, research from Nuada (2016) with the title Calculation of Cost Elements in Setting Cost of Production in Small and Medium Industries suggests the owner classifies each production cost in controlling the production costs that occur.

Analysis of Cost of Production and Cost of Goods Sold The cost of production is calculated using the Variable costing method as shown in Table

4. The results of this study are in line with Hadi, Ismono, & Yanfika (2015) that if the total non-production cost per fruit incurred is large and the amount of product produced is large, then the cost of production obtained becomes smaller also to the sausage with a selling price of Rp. 3,300.00 per 1-time consumption. The smallest cost of production is found in intervention 1 of Rp. 3,300.00 per 1-time consumption with production costs per intervention of Rp. 69.300.00 so the biggest effect on the selling price of production costs for intervention 2 is Rp. 5202.00 per 1 time of intervention. The cost of goods sold during the intervention was Rp. 109,250. The size of the production cost will affect the profits obtained by the company (Nidya Oktaviani, Wuryaningsih Dwi Sayekti, & Departement, 2021) This means that the business is efficient and profitable in accordance with the business efficiency criteria, namely if the R/C value > 1. The importance of efficiency in business is as a basis for consideration in evaluating business efficiency as well as information and considerations for determining policies in the context of business development (Harlistaria, Wignyanto, & Iksari, 2012). In calculating the cost of production and in determining the selling price, companies can use both approaches. The full costing approach can be used to sell products that are fewer in number than superior products. While the variable costing method can be used for superior products, we can also use this to maintain fluctuations in the price of materials that often change. In this case, the owner can use the two methods above by taking into account the existing conditions.

CONCLUSIONS AND SUGGESTIONS

The contribution of the nutritional value of analog sausage to the diet of children under five has a tendency to increase the contribution of nutritional intake as healthy snacks for children under five. The production cost of analog sausage shows efficient and profitable in accordance with the criteria of MSME business efficiency in the analysis of analog sausage production, so it's recommended for consumption by toddlers.

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